Fun with a computer

NPIC, Amiga, and Videotape

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The National Photographic Interpretation Center's (NPIC) TV studio, which is part of the (b)(3)(c) produces special and *ad hoc* video projects. Its primary responsibility, however, is to produce the daily *NPIC Video Executive Summary*.

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During the first six months of this year, the PEG studio averaged more than of finished videotape per month.

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When the production of the *Summary* began more than five years ago, maps and annotations were prepared manually. Each day, a scriptwriter would carefully balance a small red dot on the end of a X-acto knife and then try to stick that dot onto a base map to indicate the location of a city or installation to be featured in the *Summary*. Those paper maps were not designed for TV production, but they were the only ones available. After "dotting" several maps for each day's production, the maps were put on a board with magnets and videotaped into the *Summary*. Place names and other annotations had to be typed each day on the character generator, even though many of the same names would be used over again; we soon discovered that spelling wasn't one of our strong suits. A lot of time was wasted in preproduction, a lot of little red dots were used, and the file of paper maps became unwieldy. Obviously, something different was called for.

We thought a computer could help us solve our video graphics problems, but we wondered if our requirements were unrealistic. We did not have the luxury of a full-time, dedicated operator or artist, and only two of us had any graphics or computer background. The computer had to be easy enough to use so that everyone—engineers, scriptwriters, and production managers—would be able to retrieve and build a half-dozen maps or graphics in less than a couple of hours. The system would also have to be inexpensive and have little or no maintenance overhead. We did not have a big budget, so we were tempted to buy the system with petty cash.

Enter Amiga (b)(3)(c)

We bought our first Commodore Amiga in 1987 for less than including software. The system worked right out of the box, and we have been creating TV graphics with it ever since. The cost over the past four years has been less than (b)(3)(c) for three workstations, software, additional memory, digitizers, genlocks, hard drives, and extra floppy disk drives. We have not paid a cent for maintenance or repair, although we have worn out two mouse controls. Everyone is our studio uses the Amiga. Familiarization training takes less than two hours.

The Amiga has enabled us to build a file of hundreds of maps suitable for TV production. This usually means the maps have fewer annotations, colors, and other small details. (Typical base

maps, operational navigation charts, and world aeronautical charts have too much information for proper viewing on a TV screen.) Original maps are either traced or digitized into the Amiga and then redrawn and annotated to meet our production requirements and standards. City and target names are stored as "brushes"— elements that can be moved independently of the background, allowing us to custom annotate the maps needed for that day's script. In addition, we use icons to accent or emphasize locations on the maps, and they are also drawn as brushes. The icons are saved in appropriate subject-matter files or drawers.

Map drawing and icon building enhanced our videos, but we learned that these tasks could be somewhat mundane. To do something different, we began using animation sequences in our special productions, and recently we have gotten into three-dimensional—or x, y, z—animation. Using animation, we built, operated, and blew up an RBMK 1000 nuclear reactor in our Chernobyl videotape, and we fired a few missiles and sank a Yankee submarine in the Measurement and Signature Intelligence program.

In one special program, *Tracking Snowstorm—The Buran Launch*, Amiga graphics and animations were used from the opening title to the closing credits. The program detailed the exploitation efforts of NPIC and the Office of Imagery Analysis in following the development of, and preparations for, the first launch of the Soviet shuttle system.

The beginning of the program included a short, but comprehensive, comparison of the US and Soviet shuttle systems. Computer graphics played a critical role in succinctly comparing features of the two systems. With Amiga graphics we built and launched both shuttle systems and showed a side-by-side comparison of both orbiters. What we were able to explain clearly with computer graphics in three to four minutes would have taken 10 to 15 minutes using photographs and charts.

The program featured an account of how analysts, by exploiting overhead imagery, followed the progress of the Buran program for more than a year. Computer graphics were used to point out details in many of the overhead images.

Looking Ahead

With new software and some third-party hardware, we will be taking our Amigas into the

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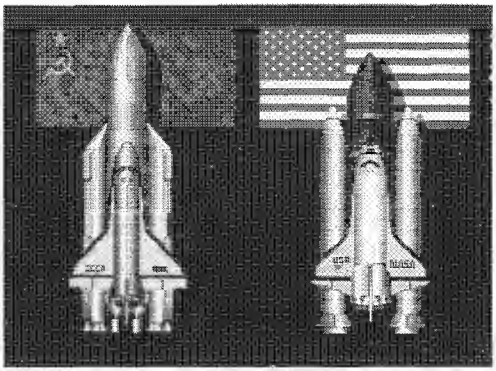

Computer animation is used to show the Soviet and US space shuttles.

future. We are experimenting with photo enhancement and colorization of black-and-white ground photography. Future Executive Summaries will include "Turnerized" ground photos.

We are also experimenting with new software that allows us to generate and animate titles and text. One of the Amigas is connected on line with our control console, so we can use the computer to draw and annotate directly onto a video image.

In another application, we are beginning to store our ground photos and collateral images in an optical disk system. Amigas will be used to create the data base for this file, and they will also be used to control the optical disk recorder and player during search and retrieval.

The versatile Amiga could be used in building an audio file of linguists pronouncing foreign words and phrases so that our narrators can reference the file for proper pronunciations. The Amiga already has stereo sound capabilities, and it would take an investment of only about $200 to try this application.

Other possibilities include sound effects and music, ray tracing, fractal processing, and a bar code reading system for controlling our videotapes. We are also looking into interactive video and artificial intelligence for training and exploitation applications. And we may be getting into a UNIX operating environment that will be available for the Amiga in 1991.

This article is classified ~~SECRET.~~

Glossary of Video Terms

bridgeboard	A device that allows the Amiga to run IBM software.
digitizer	A device used to capture and store images by converting them into pizels. (See pixels.)
flicker fixer	A device that doubles the scan rate of a monitor, thus eliminating scan lines and the "flicker" effect in high-resolution images.
fractal	A mathematical formula used with computers to generate patterns that at one time were thought to be random.
genlock	A device used to synchronize two or more video images so that they may be used on the same screen at the same time.
icon	A picture representation; a graphic image or symbol used to refer to an object.
pixels	A group of rectangular or square dots that make up a digital image.
ray tracing	A method of computer drawing that accounts for all light sources, transparencies, and reflections in a scene when rendering an object.
Turnerized	Slang. The method of electronically colorizing black-and-white movies as popularized by Ted Turner, president of the Turner Broadcasting Corporation.
UNIX	An operating system used in Sun and NeXT computers.
x, y, z	The lines of projection in three-dimensional space: height, width, and depth. In aviation, movements around these lines are called heading, pitch, and bank.